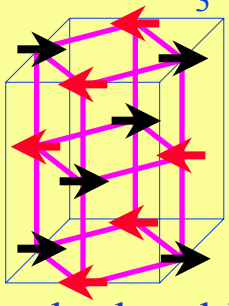
Heat Conduction as a Probe of Magnetoelastic Polarons in $Ca_{1-x}La_xMnO_3$

Joshua L. Cohn, University of Miami, 0072276

$CaMnO_3$



orthorhombic
G-type AF
$T_N \approx 125K$

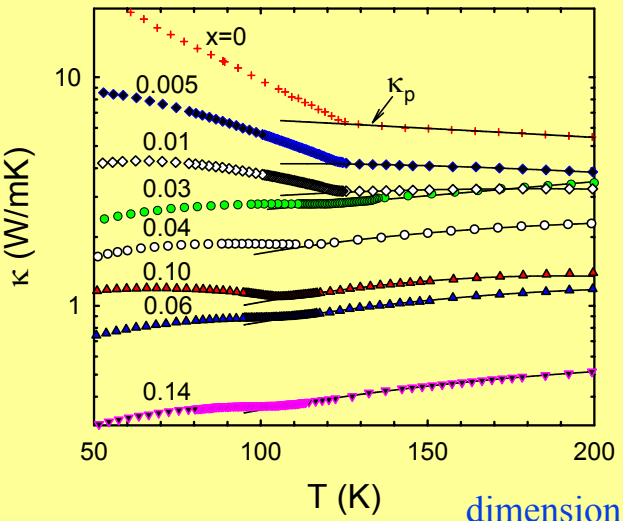
La (electron) doping…

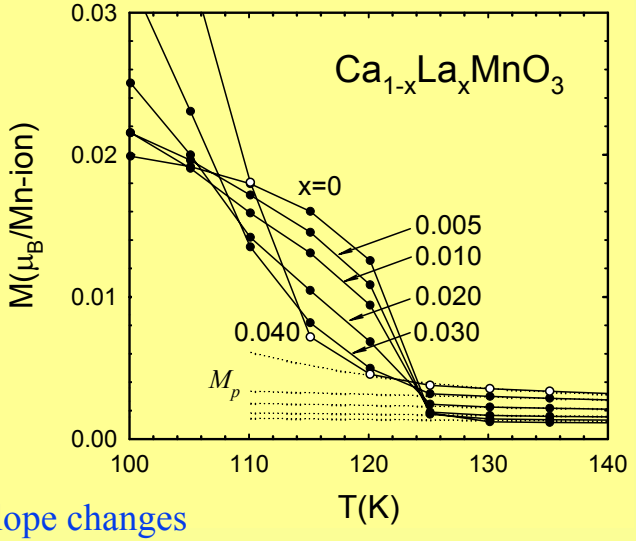
Mn^{4+} → Mn^{3+}

S=3/2 → S=2

t_{2g}^3 → $t_{2g}^3 e_g^1$

…induces a ferromagnetic (FM) magnetization



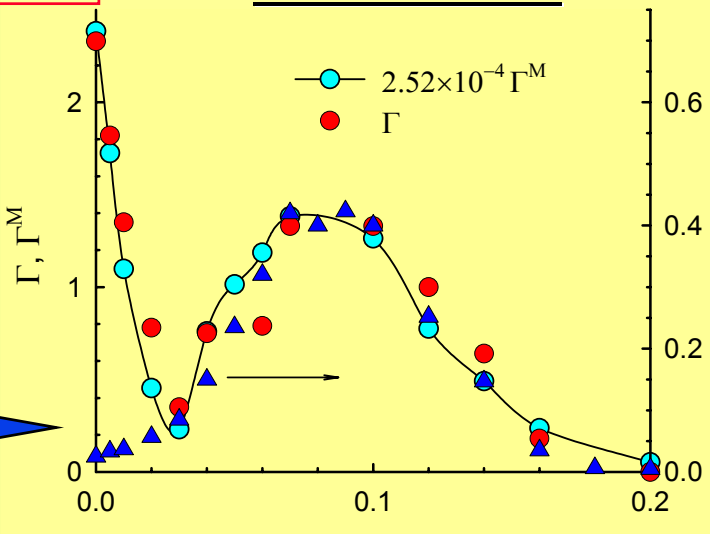


$$\Gamma \equiv -\left.\frac{d(\kappa/\kappa_p)}{dt}\right|_{t\to 1} \qquad (t = T/T_N)$$

dimensionless slope changes in thermal conductivity and magnetization at T_N correlate:

$$\Gamma^M \equiv \left.\frac{d(M/M_p)}{dt}\right|_{t\to 1}$$

lattice distortion associated with FM



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Educational:

1 undergrad,
2 grad students,
1 post-doctoral fellow

Outreach activities:

Presentation for preschool children about stars/planets

Elementary school demonstrations:
-- magnetic levitation with a superconductor
-- surface tension of water

Science fair judging – elementary school

Monthly elementary school physical science question competition

Highschool student laboratory intern for two semesters

Laboratory tours for:
-- highschool students/parents
-- middle and highschool teachers
-- college students (non-science majors)